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HYPODERMIC NEEDLE MOUNT

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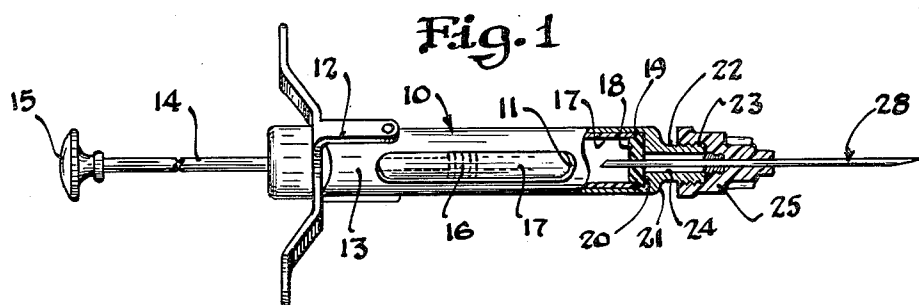
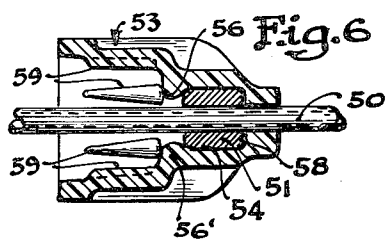
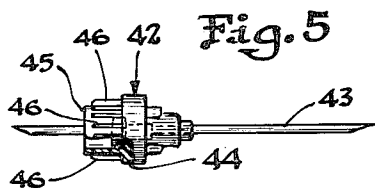
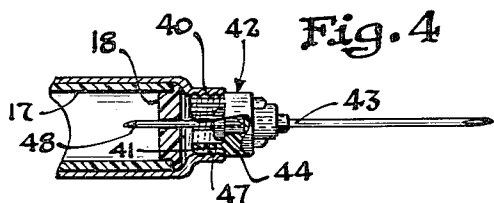
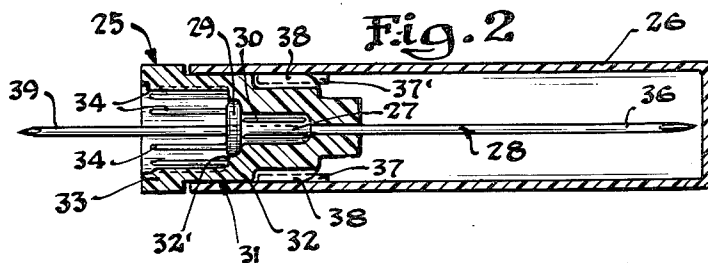
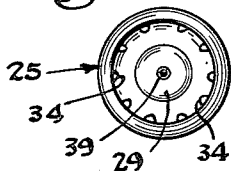


Fig. 3



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HYPODERMIC NEEDLE MOUNT

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This invention relates generally to means for readily connecting two structures, one of which is threaded; and more particularly, the present invention relates to an improved structure for detachably mounting a needle assembly on an injection device, such as a hypodermic needle on a dental cartridge syringe, wherein either the needle or the syringe, but not both, has a substantially helical locking means formed thereon for engaging the other.

Many hypodermic syringes, particularly those commonly used in the dental profession, consist of a metal syringe body, a cartridge adapted to fit within the syringe body consisting of an ampule containing a drug and having one end closed by a slidable plunger and the other closed by a penetrable rubber diaphragm, and a sterile double-ended cannula adapted to pierce the rubber diaphragm when mounted on the end of the syringe body. Generally, a threadable connection is provided between the metal syringe body and the hypodermic needle hub to insure maximum safety during the administration of the drug.

Heretofore it has been considered necessary to form mating threads on the needle hub which engage with the threads on the discharge end of the syringe body. Since different syringes frequently have different threads, it has been necessary to provide many differently threaded hubs to accommodate the several syringe bodies. It is also readily apparent that hubs and syringes which require forming threaded sections thereon are considerably more expensive to produce than those without threaded sections.

It is, therefore, an object of the present invention to provide an improved connection between a hypodermic needle and syringe body.

It is also an object of the present invention to provide an improved means for connecting a syringe body member with a hypodermic needle member wherein only one of said members is threaded.

It is a further object of the present invention to provide an improved needle hub adapted to being secured to a threaded syringe body member in such a way as to minimize contamination when fitting the needle to the syringe.

It is still another object of the present invention to provide an improved hub structure which is adapted to being mounted on a plurality of differently threaded body members.

It is still another object of the present invention to provide an improved hypodermic needle syringe structure having novel means for detachably engaging a threaded mount thereon, such as a hypodermic needle hub.

Other objects of the present invention will be readily apparent to those skilled in the art.

The novel means of achieving the foregoing and other objects of the present invention will be fully understood by those skilled in the art by referring to the following detailed description and drawing wherein:

FIGURE 1 is a side elevational view partially in vertical section of a hypodermic syringe body with a cartridge and hypodermic needle assembly operatively mounted thereon;

FIG. 2 is a vertical sectional view partially in side elevational view of the needle mount assembly of FIGURE 1 and showing a protective sheath thereon;

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FIG. 3 is an end view of the needle mount assembly of FIG. 2;

FIG. 4 is a fragmentary side elevational view partially in vertical section of a modified form of the present invention;

FIG. 5 is a side elevational view partially in vertical sectional view of the modified needle mount of FIG. 4; and

FIG. 6 is a vertical sectional view partially in side elevational view of a modified form of a needle mount assembly.

Referring to FIGS. 1-3 of the drawing, a stainless steel or the like, metallic syringe body 10 is provided with the conventional longitudinal slots 11 and a head 12 pivotally mounted adjacent the upper end 13 which carries a reciprocal plunger rod 14. The plunger rod 14 has a finger rest 15 at its outer end and means at its inner end for being secured to the sliding plunger 16 of the cartridge 17 which is disposed within the syringe body 10. The cartridge 17 has the end thereof remote from the plunger 16 sealably closed by a penetrable plug member 18. The distal end 19 of the cartridge abuts the internal shoulder 20 of the syringe body 10, and is retained within the body by the plunger rod 14 engaging the upper end thereof. The discharge end 21 of the syringe body 10 is provided with an axially disposed post or outlet means 22 which has formed on the external surface thereof a substantially helical means comprised of a threaded section 23. An axial passage 24 extends through the post 22 into the interior of the body section of the syringe.

The hypodermic needle mount assembly 25 which is adapted to being detachably mounted on the hypodermic syringe body 10 is comprised of a small diameter cylindrical collar or ring section 27 which is swedged to the cannula 28, or otherwise fixedly secured thereto intermediate the ends thereof, to provide a double-ended cannula which is pointed at both ends. The inner end of the collar 27 has a flange 29 formed thereon, and the cylindrical surface of the collar 27 has a plurality of spaced longitudinally extending ribs 30 which prevent axial and rotary movement of the cannula 28 with respect to a mounting means comprised of the hub member 31 in which the collar is seated.

The hub member 31 is comprised of a body section 32 preferably having a generally cylindrical configuration with an axial passage 32' extending therethrough. The upper surface of the body section 32 has a ferrule or skirt section 33 extending axially outwardly. In the body section 32, the axial passage 32' is adapted to frictionally receive therein the cylindrical collar 27 with the ribs 30 engaging the inner surface of the outer small diameter section of the passage 32'. The flange section 29 engages the surface of the body section 32 restricting the axial movement of the cannula in the passage 32'.

The skirt section 33 is provided with a plurality of spaced longitudinal splines or ribs 34 which extend radially inwardly toward the axis of the passage 32' to provide a free passage within the skirt section having a diameter less than the exterior diameter of the threaded section 23 of the syringe body with which it is adapted to engage. In the preferred form of the invention, the splines 34 do not extend to the inner or proximal end of the skirt 33 but are spaced therefrom to provide a lead or guide which greatly facilitates threading by aligning the axis of the needle with the axis of the syringe.

In operatively mounting the needle assembly 25 on the externally threaded section 23 of the syringe body, the needle assembly 25, preferably positioned in a protective casing or sheath 26 with the skirt section 33 extending outwardly from the open end thereof, is inserted over the threaded section 23 by the operator and rotated by turning

the protective casing 26 which serves as a wrench with the internal ribs 37 engaging the lugs 38 formed on the outer surface of the body section 32. As the hub member 31 is rotated, the threads 23 of the syringe body tap or otherwise impress threads on the splines 34, as the non-yielding threads of the syringe body engage the relatively softer and yielding surface of the splines 34. Any material which is removed from the splines by the threads during the threading process is deposited between the spaced splines and is retained therein. The rotation of the hub assembly 25 is continued until the hub member 31 is fully seated on the discharge outlet 22 of the syringe body with the short proximal cannula 39 extending sufficiently into the body section 10 to penetrate the plug 18 and communicate with the interior of the cartridge 17. When the operator desires to administer the drug, the protective sheath 26 can be withdrawn from the hub assembly 25 and the drug administered through the distal cannula 36. It will be apparent that the engagement between the threads on the syringe body 10 and those formed in the splines 34 prevent the hub being removed by pulling longitudinally but will be readily disengaged by rotation in a reverse direction.

In the modified form of the invention shown in FIGS. 4 and 5, the threaded section 23 of the syringe body is replaced by an internally threaded nipple or skirt section 40 providing a passage 41 extending into the interior of the syringe body. A needle assembly 42 is adapted operatively to engage with the threaded section 40 and is comprised of a cannula 43 having a needle mount or hub 44 secured thereto intermediate the ends thereof to provide a double-ended cannula. The inner end of the hub has a generally cylindrical post section 45 and is provided on the outer surface thereof, preferably at a section spaced from the end thereof, with a plurality of spaced longitudinal splines 46 extending radially outwardly. The maximum exterior diameter of the end of the post section 45 is less than the interior diameter of the threaded skirt section 40, whereas the outer diameter of the section of the post 45 including the splines 46 extending therefrom is larger than the internal diameter of the threaded section 40 of the syringe body, whereby the splines 46 engage the threads 47 on the section 40 when the needle assembly 42 is inserted within the skirt section 40 and rotated. The threads 47 tap or otherwise form corresponding threads in the splines 46 as the needle assembly 42 is rotated by means of a protective sheath, or the like, as illustrated in FIG. 2. When the needle assembly is fully seated, the proximal cannula 48 extends sufficiently into the interior of the body section of the syringe to penetrate the sealing diaphragm of the cartridge enclosed therein.

In the modified form of the invention shown in FIG. 6, a hypodermic needle cannula 50 having a small diameter tubular collar or sleeve 51 generally oval-shaped in vertical section swedged or otherwise secured to the cannula 50, is mounted in a hub member 53, preferably fabricated of a yieldable resilient plastic material, by forcing the sleeve 51 axially into a receiving cavity 54 in the outer or distal end of an axial passage extending through the hub member 53. The receiving cavity 54 has inwardly extending lip portions 56, 56' at its proximal end, forming a restricted opening through which the sleeve 51 is adapted to pass and which prevents axial movement of the needle. As the sleeve 51 is thus "snap-fitted" into the receiving cavity 54, it resiliently engages the inner walls of the cavity 54 and is restrained from rotating with respect to the hub 53. The outer end of the axial passage is restricted as at 57 which permits the cannula to pass therethrough and provides an abutment surface 58 which prevents the sleeve 51 from moving axially outwardly. If desired, the lip portions 56, 56' can be provided on the extreme outer end of the cavity 54.

The ferrule or skirt portion of the hub member 53 is similar in construction to the skirt section 33 of FIGS.

1-3 but differs therefrom by having formed on the inner lateral surface thereof an improved spline structure. Thus, each of the spaced longitudinally extending splines 59 has a relatively small transverse width and radial thickness at the outer end thereof beginning at a point spaced slightly inwardly from the flanged edge of the skirt section and gradually increases in thickness and width along the axial length of the said spline to provide a gradually inwardly tapering spline. Thus, when the hub 53 is mounted on a male threaded outlet of a syringe body in the same general manner as the hub assembly shown in FIG. 2, initially the thread tapping action on the splines 59 is slight, but rapidly increases as the hub 53 is rotated and the holding power of the splines 59 increases correspondingly as the hub 53 is rotated.

It will be apparent from the foregoing description, that when hypodermic needle mounts, whether of the double-ended cannula type or of the single cannula type, are provided with the improved structures of the present invention shown in FIGS. 1-3, 4, 5, and 6, respectively, considerable savings in production costs will result due to mold simplification and lower rejection rates of the molded parts due to the simplified structure. It should also be apparent that the hubs of the present invention make it possible to more conveniently and rapidly mount the hypodermic needles on a threaded syringe body, since it is not necessary to engage two sets of threaded members and it is not necessary to have precisely matching threaded parts, or parts having precisely the same diameters to effect a secure engagement between the parts.

And, while the specific embodiments of the present invention described herein have employed a molded plastic hub, or a molded plastic syringe body composed of polyethylene, it is possible to use other plastics, such as methyl methacrylate, polystyrene, or the like, which can be readily deformed without fracturing by a metal or other relatively rigid threaded part which is relatively non-yielding with regard to the splines. For example, the present invention can also be applied to die cast hubs of a soft zinc alloy, or other yieldable metal compositions, and the threads or similar helical locking means can, if desired, be made of a rigid molded plastic.

It should be understood that the present invention is not restricted to being used with a particular threaded section, but rather can be adapted for use with any of the structures having a substantially helical locking means formed thereon which are relatively non-yielding with respect to the splines, and may consist of a single continuous helical thread or may, if desired, be a discontinuous helical thread or the like, connection having an angular surface for engaging and moving longitudinally a post to be connected therewith.

It should also be apparent to those skilled in the art, that the present invention is not restricted to mounting a cannula on a syringe, but can also be used for mounting or securing various venoclysis and plastic parts, such as a tubing fitment, adapter, or closure, to a threaded syringe, administration set, fitment, or other threaded part.

Others may practice the invention in any of the numerous ways which are suggested to one skilled in the art, by this disclosure, and all such practice of invention are considered to be a part hereof and fall within the scope of the appended claims.

I claim:

1. A hypodermic needle mount formed of yieldable plastic material for mounting a hypodermic needle on a hypodermic syringe having an axial outlet end provided with a helical locking means formed integrally therewith which comprises; a generally cylindrical body section, a hypodermic needle cannula fixedly secured in said body section and extending axially outwardly from said body section, said body section having a cylindrical mounting section extending longitudinally from said body section, said mounting section having on a peripheral surface thereof a plurality of circumferentially spaced deforma-

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ble splines extending radially and longitudinally on said peripheral surface, said body section having formed on an outer peripheral surface thereof spaced from said splines and extending longitudinally in an opposite direction from said splines a plurality of circumferentially spaced lugs, and said lugs providing means adapted to form an interlocking engagement with a protective enclosure for said cannula to bring said splines into mounting engagement with said helical locking means of a hypodermic syringe and thereby forming a substantially rigid connection between said helical locking means and said hypodermic needle mount; whereby said cannula is maintained secure against axial and transverse movement relative to said syringe.

2. A hypodermic needle mount as in claim 1, wherein said housing section has a reduced diameter section extending inwardly from one end of said splines, and said reduced diameter section is adapted to make a bacteria-impervious engagement with said hypodermic syringe end helical locking means when said hypodermic needle mount is fully seated on said axial outlet end of said syringe; whereby a substantially rigid bacteria-impervious

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connection is formable between said syringe and said hypodermic needle mount which maintains said cannula secure against axial and transverse movement relative to said syringe.

3. A hypodermic needle mount as in claim 1, wherein said splines are disposed in close proximity to each other around said peripheral surface.

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